The Adhesive and Sealant Council maintains ties with many technical experts in the industry. In most cases the connection focuses on either adhesives or sealants but a few industries rely on products that encompass the complete field of technology by employing both adhesives and sealants. The SIP (Structural Insulated Panel) industry is one of those industries. Since the initial lamination of substrates in the 1930’s, the growth of the SIP industry has largely been very successful. The recent convergence of energy concerns, global warming, sustainability, and energy conservation has brought SIPs into the global construction industry as a viable contender that will pull market share away from conventional building systems.

A SIP is commonly made up of three separate components. The outside substrates are usually OSB (in formats as large as 8’ X 24’), the closed cell foam core is usually EPS (Expanded Polystyrene) and occasionally XPS or PU (Extruded Polystyrene or Polyurethane), and the final component is the structural adhesive.

These adhesives have been predominantly two-component, water-based adhesives and moisture-cured urethanes. The newcomer to the SIP production arena is the hot melts. The choice of adhesives has been a function of the manufacturers’ equipment and the specific substrate (wood, metal, magnesium oxide board, etc.).
The connection to the ASC doesn’t stop when the SIP is laminated. In fact, the installation of these panels relies heavily on the sealants used to ensure the panel system provides an airtight envelope. The sealants being used most commonly are mastic or caulk that is deployed in quart-sized caulk guns. In addition, some manufacturers use either single or two component expanding foams to ensure the system is airtight.

An important function of sealants in the building industry, especially the SIP industry, is to act as an air block and maintain that seal over the service life of the structure. As these commercial and residential structures move with the host of forces that impose their will on the envelope, the sealants must have the flexibility and resilience to move with the structure and not crack or tear.

It is the sealants’ flexibility and durability that allows SIP structures to show very high levels of energy efficiency. These efficiencies are attributed to both the high R-value of the panel itself and, just as importantly, the inherent air tightness of these structures. When tested for air tightness, a SIP structure will exhibit performance data that shows it to be 10-15 times tighter than conventional construction.

This level of tightness in a building’s envelope is a very good thing in terms of energy efficiency. In addition, it is the tightness that forces building designers to employ properly designed and installed ventilation equipment to ensure proper indoor air quality.

The concept of good indoor air quality (IAQ) is forcing the entire construction industry to look at ventilation strategies as well as minimizing the use of products that contain harmful components that could be adversely affect air quality. Recent issues with formaldehyde in certain wood products have brought the attention of IAQ to center stage. The USGBC’s LEED Program has specific guidelines to reduce VOCs (volatile organic compounds) that can have a negative impact.

The SIP industry is one of many industries that use a host of both adhesives and sealants. It is those components that, when properly used, create an energy efficient envelope. However, the proper specification and use is increasingly demanded by a buying public that understands the importance of IAQ. It is crucial that the users of adhesives and sealants understand the critical role they play in sound construction as well as a functional and healthy environment.